

80308  
SOV/81-59-7-22596

5.3200

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 7, p 73 (USSR)

AUTHORS: Sokol'skiy, D.V., Shmonina, V.P., Skopin, Yu.A., Tverdokhlebova,  
N.S., Dunina, L.P.

TITLE: The Investigation of the Liquid-Phase Hydration of Acetylene<sup>1</sup>  
According to Kucherov. I. The Effect of the Composition of the  
Catalytic Solution on the Course of the Reaction

PERIODICAL: Tr. In-ta khim. nauk. AS KazSSR, 1958, Nr 2, pp 158 - 172

ABSTRACT: The hydration of  $C_2H_2$  was studied by passing it through a sulfuric  
acid solution of  $HgO$  and  $Fe_2(SO_4)_3$ , depending on the composition  
and the temperature of the solution, the rate and the duration of  
passing  $C_2H_2$  through the solution. The loss of catalytic activity  
of mercury compounds in the course of the process is caused by re-  
ducing them to mercury metal with its removal from the solution.  
In the absence of oxide iron the deactivation of the catalyst takes  
place more quickly, the introduction of  $Fe_2(SO_4)_3$ , though pro-  
moting the removal of mercury from a solution in a more dispersed  
state, inhibits its reduction, increasing the reaction rate. The

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The Investigation of the Liquid-Phase Hydration of Acetylene According to Kucherov. I. The Effect of the Composition of the Catalytic Solution on the Course of the Reaction

optimum passing rate of  $C_2H_2$  at  $96^\circ C$  is 4.3 ml/min per 1 ml of contact solution, the optimum temperature is  $75^\circ C$ . The presence of  $H_2SO_4$  is necessary even in the presence of an intermediate compound formed between  $C_2H_2$  and the catalyst. In the case of a change in the concentration of the contact solution, the yield of acetaldehyde passes through a maximum corresponding at  $96^\circ C$  to a composition of 23.8%  $H_2SO_4$  and 10%  $Fe_2(SO_4)_3$ ; the highest productivity is attained at  $75^\circ C$  and a composition of 13.7%  $H_2SO_4$  and 17%  $Fe_2(SO_4)_3$ . The introduction of small quantities of chlorine reduces the total yield of  $CH_3CHO$  leading to a rupture, the addition of small quantities of  $CCl_4$ ,  $C_2Cl_6$ ,  $C_2H_4Cl_2$  increases the yield of  $CH_3CHO$ ; chloroorganic compounds, as well as  $NaCl$  taken in large quantities exert a negative effect. In the beginning of the reaction the  $CH_3CHO$  yield is less than average, the maximum yield, exceeding 100%, is attained after 3 hours, which is due to the initial formation and the subsequent decomposition of intermediate products; later on the yield decreases again due to the intensification of side processes.

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S. Kiperman

ZHANALINOVA, A.N.; SOKOL'SKIY, D.V.

Rate of hydrogenation of unsaturated compounds in mixed solvents.  
Trudy Inst.khim.nuak AN Kazakh. SSR 2:222-228 '58.

(MIRA 12:2)

(Hydrogenation)

(Unsaturated compounds)

5(1), 5(3)  
AUTHORS:

Sokol'skiy, B. V., Fisman, A. E.

SOV/1993-52-3-20/30

TITLE:

The Dependence of the Hydrogenation Velocity on the Catalyst Quantity (Zavisimost' skoresti gidrirovaniya ot kolichestva katalizatora)

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1990, Nr 3, pp 111 - 120 (USSR)

ABSTRACT:

The above mentioned velocity in the liquid phase is, according to the opinion of most scientists, proportional in the presence of small weighed portions, to the catalyst quantity and approaches the maximum value in the presence of large weighed portions. The aim of the present paper was to investigate the problem mentioned in the title under model conditions by means of the potentiometric method, as this makes the evaluation of the processes on the catalyst surface possible. Hexyne-1 and trans-piperylene served as experimental objects. The carefully purified and rectified hydrocarbons mentioned ( Table page 111) were hydrogenated on a special nickel skeleton

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The Dependence of the Hydrogenation Velocity on the Catalyst Quantity

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catalyst in a perfected hydrogenation plant (Ref 11) (Fig 1). The catalyst was once more saturated with hydrogen for 1 hour. In the hydrogenation of hexyne-1 in n-heptane and of trans-piperylene in ethanol the specific activity of the catalyst passes through a maximum if the quantity of the latter is changed. The hydrogenation kinetics is determined by three processes related to each other: a) By the hydrogenation of the substance at the expense of the hydrogen of the gas phase. b) By dehydrogenation from the catalyst, and c) By the saturation of the catalyst. The rate of hydrogenation of hexyne-1 in absolute ethanol is, in the presence of relatively small weighed portions of nickel, proportional to the quantity of the latter; this velocity approaches its maximum in the presence of big weighed portions of nickel (Refs 1-5 are proved). The maximum value of the specific catalytic activity occurs with certain values of the catalyst potential, i.e. at a certain degree of filling of the active

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The Dependence of the Hydrogenation Velocity on the  
Catalyst Quantity

SOV/133-58-3-20/50

surface by reacting molecules. There are 8 figures,  
2 tables, and 26 references, 12 of which are Soviet.

ASSOCIATION: Institut khimicheskikh nauk AN Kazakhskoy SSR  
(Institute of Chemical Sciences, AS Kazakhskaya SSR)  
Kafedra kataliza i tekhnicheskoy khimii (Chair of  
Catalysis and Technical Chemistry)

SUBMITTED: October 9, 1957

Card 3/3

SOKOL'SKIY, D.V.; SHMONINA, V.P.; POPOVA, N.M.

Investigation of liquid-phase hydration of acetylene according to  
Kucherov. Part 2: State of mercury in the acid catalyst. Trudy Inst.  
khim.nauk AN Kazakh. SSR 3:173-181 '58. (MIRA 12:2)  
(Mercury) (Catalysis)

AUTHORS: Fasman, A. B., Sokol'skiy, D. V. SOV/156-58-4-5/49

TITLE: Velocity and Selectivity Dependence in Heterogeneous Catalytic Reactions on the Catalyst Quantity (O zavisimosti skorosti i selektivnosti geterogennykh kataliticheskikh reaktsiy ot kolichestva katalizatora)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 4, pp 630-634 (USSR)

ABSTRACT: In the present paper the problem of the influence of the catalyst quantity on the kinetics of the mono and bimolecular processes in liquid phases was investigated. The equation (8) was suggested for the determination of the rate of reaction:

$$W = \frac{K_w k' A_0 S}{\frac{V}{b} + k' S} \left[ \exp \left( - \frac{K_w k' S}{\frac{V}{b} + k' S} t \right) \right] \quad (8)$$

During the catalytic processes the selectivity was investigated in dependence on the catalyst quantity in three systems. It was found that with small differences in the adsorption properties of the components the rate of reaction is not influenced

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SOV/156-58-4-5/49

Velocity and Selectivity Dependence in Heterogeneous Catalytic Reactions  
on the Catalyst Quantity

by change of the catalyst quantity. With different adsorption properties of the components the selectivity of the catalytic process can be controlled by change of the catalyst quantity. There are 28 references, 16 of which are Soviet.

ASSOCIATION: Kafedra kataliza i tekhnicheskoy khimii Kazakhskogo gosudarstvennogo universiteta (Chair of Catalysis and Technical Chemistry at the Kazakh State University)

SUBMITTED: February 11, 1958

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3/081/60/000/018/001/009  
A006/A001

Translation from: Referativnyy zhurnal, Khimiya, 1960, No. 18, p. 64, # 72583

AUTHORS: Omarova, S. R., Sokol'skiy, D. V. 11.11

TITLE: Study of the Catalytical Properties of Pd-Ag Alloys

PERIODICAL: Vestn. zap. Kazakhsk. un-ta, 1958, Vol. 44, pp. 40 - 46

TEXT: A study was made of kinetics of hydrogenation of dimethyl acetylenyl carbinol and allyl alcohol on Pd-Ag alloys of 4:1, 3:2 and 3:7 composition. It is shown that the order of reaction for a triple and double bond is the same (zero) at all the temperatures (50, 40, 30, 20°C). The rate of hydrogenation of a triple bond is in all cases higher than that of a double bond. In hydrogenation of a triple bond on Pd-Ag alloys silver centers participate in the activation of a non-saturated compound. On Pd-Ag alloys the di-phase-dissolved hydrogen does not participate in hydrogenation reactions of bonds  $> C = C <$  and  $- C \equiv C -$ .

The author's summary

Translator's note: This is the full translation of the original Russian abstract

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PHASE I BOOK EXPLOITATION SOV/3537

Akademiya nauk Kazakhskoy SSR. Institut khimicheskikh nauk

Trudy, t. 5 (Transactions of the Institute of Chemical Sciences, Kazakh SSR, Academy of Sciences, Vol 5) Alma-Ata, Izd-vo Akademii nauk Kazakhskoy SSR, 1959. 154 p. 1,000 copies printed.

Ed.: N.D. Zhukova; Tech. Ed.: Z.P. Rorokina; Editorial Board of Series: D.V. Sokol'skiy (Resp. Ed.), V.G. Gutsalyuk, and B.V. Suvorov (Resp. Secretary).

PURPOSE: This collection of articles is intended for personnel of scientific research laboratories, laboratories of industrial enterprises, and faculty members of schools of higher education.

COVERAGE: The collection reviews problems of liquid-phase catalytic hydrogenation to upgrade and reactivate various products. Hydrogenation of unsaturated bonds of various types, adsorption of hydrogen on different catalysts, chromatographic separation of mixtures, and the effect of halogen salts of alkali metals on the rate of hydrogenation reactions promoted by various skeleton catalysts are described. Conditions of catalytic hydrogenation

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Transactions of the Institute (Cont.)

SOV/3537

of natural fat, sunflower oil, and such synthetic products as esters of high-molecular fatty acids are set out. Dehydration of the butane fraction carried out in combination with isomerization is analyzed. Principles of selecting catalysts and regenerating them are reviewed and the formation of adsorption potentials on metal catalysts is explained. Each article presents conclusions drawn on the basis of experimental findings. References accompany most of the articles.

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Transactions of the Institute (Cont.)

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- Shmonina, V.P., K.M. Vlasova, and D.V. Sokol'skiy. Catalytic Reduction of Aromatic Nitro Compounds. Part IX 72
- Flid. R.M. [Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V. Lomonosova--Moscow Institute of Fine Chemical Technology imeni M.V. Lomonosov]. Some Principles of Selecting Catalysts for Liquid-Phase Hydration of Acetylene to Acetaldehyde 81
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5(1)

SOV/156-59-1-7/54

AUTHORS:

Golodova, L. S., Sokol'skiy, D. V.

TITLE:

A Potentiometric Method for Investigating the Selectivity on Hydrogenation of Fats in Solvents (Potentsiometricheskii metod issledovaniya selektivnosti pri gidirovani zhirov v rastvoritelyakh)

PERIODICAL:

Rauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 1, pp 23 - 31 (USSR)

ABSTRACT:

The potentiometric investigations of the hydrogenation of oils unsaturated in various degrees and of synthetic esters of unsaturated fatty acids proved that the potential of the catalyst shows the composition change undergone by glycerides or other esters on hydrogenation. The investigation was carried out on a nickel skeleton catalyst in absolute ethyl alcohol. The diagrams of the potential curves were plotted and, in addition, the intermediate samples were analyzed. The hydrogenation proceeds selectively as is shown by the example of a mixture of linoleic and oleic acid (hydrogenation of the sunflower oil, Diagram, Fig 1 and Table 1).

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A Potentiometric Method for Investigating the Selectivity SOV/156-53-1-7/54  
on Hydrogenation of Fats in Solvents

First, the more unsaturated linoleic acid is hydrogenated. The oleic acid content increases whereas the stearic acid content increases only slowly. The hydrogenation of oleic acid does not start before the linoleic acid has been hydrogenated to a large extent. Now its content decreases rapidly; the stearic acid content increases rapidly. Diagram and table show the course of the potential curve during the hydrogenation of methyl esters of linoleic and oleic acid. There are 4 figures, 2 tables and 1 Soviet reference.

ASSOCIATION: Kafedra biokhimii Kazakhskogo gosudarstvennogo meditsinskogo instituta i kafedra kataliza i tekhnicheskoy khimii Kazakhskogo gosudarstvennogo universiteta im. S. M. Kirova (Chair of Biochemistry of the Kazakh State Institute of Medicine and Chair of Catalysis and Technical Chemistry of Kazakh State University imeni S. M. Kirov)

SUBMITTED: June 16, 1958

Card 2/2



SOKOL'SKIY, D.V.; ZAKUMBAYEVA, G.D.

Effect of alkali metal halides on the mechanism of hydrogenation of  
cyclohexene on platinum black. Izv. AN Kazakh. SSR. Ser. khim. no. 1:  
62-64 '59. (MIRA 13:6)

(Alkali metal halides)  
(Hydrogenation)  
(Cyclohexene)

POPOVA, N.M.; SOKOL'SKIY, D.V.

Hydrogenation of furfureole on Ni - ZnO catalysts. Izv.AN Kazakh.  
SSR.Ser.khim. no.1:65-70 '59. (MIRA 13:6)  
(Furaldehyde)  
(Hydrogenation)

MELEKHINA, L.S.; SOKOL'SKIY, D.V.

Potentiometric investigation of the hydration of fats. Izv.  
AN Kazakh.SSR.Ser.khim. no.2:32-34 '59. (MIRA 12:8)

1. Kafedra biokhimii Kazakhskogo meditsinskogo instituta i  
Kafedra kataliza Kazakhskogo gosudarstvennogo universiteta.  
(Hydration) (Oils and fats)

MELEKHINA, L.S.; SOKOL'SKIY, D.V.

Kinetics of the hydration of methyl esters of oleic and linoleic acids and their mixtures. Izv.AN Kazakh.SSR.Ser.khim.  
no.2:35-40 '59. (MIRA 12:8)  
(Oleic acid) (Linoleic acid) (Hydration)

GOLODOV, F.G.; SOKOL'SKIY, D.V.

Hydration of vinyl ethers. Izv.AN Kazakh.SSR.Ser.khim. no.2:  
41-50 '59. (MIRA 12:8)  
(Hydration) (Ethers)

BEZVERKHIOVA, S.T.; SOKOL'SKIY, D.V.

Reduction of oxygen by skeleton nickel catalysts. Izv. AN Kazakh.  
SSR. Ser. khim. no. 2:51-55 '59. (MIRA 12:8)

1. Kafedra khimii Kazakhskogo sel'skokhozyaystvennogo instituta  
i kafedra kataliza Kazakhskogo gosudarstvennogo universiteta.  
(Oxygen) (Reduction, Chemical) (Catalysts, Nickel)

5(1,3,4)

AUTHORS:

Fasman, A. B., Khaldeyev, O. D., Sokol'skiy, D. V.

SOV/153-2-1-22/25

TITLE:

Generation of Triboelectricity During the Catalytic Hydrogenation in Non-conductive Media (O vozniknovenii triboelektrichestva pri kataliticheskoy gidrogenizatsii v neprovodyashchikh sredakh)

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 1, pp 123-125 (USSR)

ABSTRACT:

Static electricity with a potential of several kilovolts is produced by the friction of dielectric liquids at the container- or the tube walls of any shape (Refs 1-3). If conductive substances are added to hydrocarbon, the electric charge first increases and is then reduced and ceases completely at specific resistances of below  $10^{10}$  ohms.cm. Since during the catalytic hydrogenation dielectric liquids (hydrocarbons, ether) are employed by intensely stirring the reaction mass, it was interesting to determine whether friction electricity is herein produced and how it affects the process of hydrogenation. Figure 1 shows an apparatus designed for measuring the electrification potential. Figure 2 gives the charge curves for n-heptane and

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Generation of Triboelectricity During the Catalytic Hydrogenation in  
non-conductive media

SOV/153-2-1-22/25

its mixtures with absolute ethanol. The electrification attains maximum velocity at a specific resistance  $p = 3 \cdot 10^{12}$  ohms.cm. At  $p = 10^{11}$  ohms.cm the electrification drops and ceases at  $10^{10}$  ohms.cm (in accordance with reference 4). Apparently, the velocity of charge and discharge depend in various ways on the resistance of the medium. The voltage is rapidly increased by intense stirring. In the next experimental series a skeleton nickel catalyst was employed additionally (method of reference 5).

Also in this case maximum voltage occurred at  $p = 3 \cdot 10^{12}$  ohms.cm. Consequently, the process of electric charge is intensified by a fine-disperse powder with large surface ( $\approx 70 \text{ m}^2/\text{g}$ ). The action on the course of the process is to be taken into account during the hydrogenation in solvents with high specific resistance. The extension of the interatomic distance by the electrostatic field is bound to increase the reactivity of molecules of unsaturated compounds. There are 2 figures and 7 references, 6 of which are Soviet.

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Generation of Triboelectricity During the Catalytic Hydrogenation in  
non-conductive Media SOV/153-2-1-22/25

ASSOCIATION: Institut khimicheskikh nauk AN Kaz.SSR i Kazakhskiy  
gosudarstvennyy universitet (Institute of Chemical Sciences of  
the Academy of Sciences of the Kazakh SSR and Kazakh State  
University)

SUBMITTED: December 20, 1957

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SOV/153-2-3-6/29

5(2), 5(4), 5(3)

AUTHORS: Zakumbayeva, G. D., Sokol'skiy, D. V.

TITLE: The Effect of Potassium Iodide on the Catalytic Hydrogenation of Some Organic Compounds

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 3, pp 340-344 (USSR)

ABSTRACT: At the beginning various results on investigations of the effect mentioned in the title are quoted (Refs 1-7). The following Soviet authors are mentioned: Aykazyan and Fedorova (Ref 4) and Pleskov (Ref 5). The hydrogenation process of various organic compounds was investigated on a skeleton nickel catalyst (0.3 g) with 20, 30, and 40° in 50 % ethyl alcohol. The solutions were 1N, 0.5N, 0.1N and 0.01 N of potassium iodide. The kinetic and potential curves of the hydrogenation were recorded, namely for the following substances: cyclohexene (Fig 1), allyl alcohol (Fig 2 and Table), mesityl oxide (Fig 3), and n-nitrophenol (Fig 4). The following was found: The iodide ion reduces the rate of hydrogenation of unsaturated compounds and displaces the potential of the catalyst to the negative values. The inhibiting effect of the iodide is stronger than

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The Effect of Potassium Iodide on the Catalytic Hydrogenation of Some Organic Compounds SOV/153-2-3-6/29

that of the bromide; it still increases with the increasing dipole moment of the hydrogenated substance. The rate of hydrogenation depends on the fact to what degree the substance to be hydrogenated may reach the surface of the catalyst. There are 4 figures, 1 table, and 11 references, 10 of which are Soviet.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR i Kazakhskiy gosudarstvennyy universitet imeni S. M. Kirova - Kafedra kataliza i tekhnicheskoy khimii (Institute of Chemical Sciences AS KazSSR and Kazakh State University imeni S. M. Kirov - Chair of Catalysis and Technical Chemistry)

SUBMITTED: March 14, 1958

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5.1190

5(3)

AUTHORS:

Buvalkina, L.A., Pavlov, G.V.,  
Sokol'skiy, D.V.

67844

S/153/59/002/06/022/029  
B115/B000

TITLE:

The Dehydroisomerization of n-Butane<sup>1</sup> on Mixed Chromous Catalysts<sup>7</sup>

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 6, pp 930-937 (USSR)

ABSTRACT:

The present paper deals with the possibility of simultaneous hydrogenation and isomerization of n-butane in the presence of a number of oxide catalysts. This reaction is very important in the production of high-octane components for motor fuels as well as of synthetic rubber. Cr<sub>2</sub>O<sub>3</sub> - Al<sub>2</sub>O<sub>3</sub>, an aluminosilicate catalyst worked-up by cracking, Cr<sub>2</sub>O<sub>3</sub> on worked-up aluminosilicate, and Cr<sub>2</sub>O<sub>3</sub> on silica gel were used as catalysts for the dehydroisomerization of n-butane. Experiments were made in a unit with continuous flow, and the initial raw materials and reaction products were analyzed in a Podbil'nyak apparatus. The industrial n-butane fraction contained, in addition to n-butane (about 70 to 85%), also butene (5% at most), isopentane, and n-pentane (20% and more). About 150 experiments were

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The Dehydroisomerization of n-Butane on  
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made with the catalysts mentioned, where the temperatures (from 500 to 700°) and the rates of flow (from 100 to 2,000 cm<sup>3</sup> per minute per 100 cm<sup>3</sup> of the catalyst) were varied. The catalyst was recovered by air at 500°. The yields of end products (butene and isobutane) were related to the quantity of n-butane reacted and passed, and to the raw material passed (sum of n-butane and pentanes). The results of an experiment and the calculation of the material balance for dehydroisomerization are given (Table 1) as well as conditions of catalytic isomerization and dehydrogenation of n-butane giving maximum yields of isobutane and butene (Table 2). This happened when the sum of isobutane and butene was 37.4%, the rate of flow of the raw material 700 cm<sup>3</sup> per minute, and the temperature 580°. When a catalyst consisting of worked-up aluminasilicate was used, the total yield of isobutane and butene was, for a rate of flow of the raw material of 200 cm<sup>3</sup> per minute and a temperature of 600°, 26.1% (Table 3). When Cr<sub>2</sub>O<sub>3</sub> on worked-up aluminosilicate was used, the total yield of isobutane and butene was, for 1,000 cm<sup>3</sup> per minute and 570°, 32.2% (Table 4), and, finally, when Cr<sub>2</sub>O<sub>3</sub> on silica gel was used, at 600 cm<sup>3</sup> per

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The Dehydroisomerization of n-Butane on  
Mixed Chromous Catalysts

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B115/3000

minute and 600°, the total yield of isobutane and butene was 56.6% (Table 5). In table 6, the dehydrogenation and isomerizing characteristics of the groups of oxide catalysts are compared. It is shown that, at a low n-butane content (58.6%) in the raw material, isobutane and butene may form on Cr<sub>2</sub>O<sub>3</sub> on aluminosilicate at the expense of the conversion of pentanes. The presence of more than 5% isobutane and pentene in the raw material reduces the yields of these compounds on the dehydroisomerization of industrial n-butane fractions, if Cr<sub>2</sub>O<sub>3</sub> on aluminosilicate is used. At temperatures above 700°, n-butane is simultaneously pyrolyzed on the dehydroisomerization catalysts to give C<sub>1</sub> to C<sub>4</sub> hydrocarbons. When passed over the catalysts investigated, 50 to 70% of n-butane is converted. The low quantity of liberated hydrogen (2%, at most) is explained by its consumption to reduce chromic oxide to lower oxides which is not in disagreement with the results obtained by Obolentsev (Ref 5), Balandin, Zelenskiy and others (Ref 8). This paper was lectured on the All-Union Conference on "Methods Used to Synthesize Initial Products for the Preparation of

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The Dehydroisomerization of n-Butane on  
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B115/B000

High Polymers" (Vsesoyuznaya konferentsiya "Puti sinteza  
iskhodnykh produktov dlya polucheniya vysokopolimerov") held  
in Yaroslavl' from September 29 to October 2, 1958. The  
student Z.F.Prusakova took part in the experiments. There  
are 6 tables and 14 references, 12 of which are Soviet. ✓

ASSOCIATION: Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova  
(Kazakhskiy State University imeni S.M.Kirov)

Card 4/4

SOKOL'SKIY, D.V.; ZAKUMBAYEVA, G.D.

Reduction of p-nitrophenol on a nickel skeletal catalyst in the  
presence of potassium chloride, bromide, and iodide. Trudy Inst.  
khim.nauk AN Kazakh.SSR 5:3-8 '59. (MIRA 13:6)  
(Phenol) (Reduction)



ZAKUMBAYEVA, G.D.; SOZOL'SKIY, D.V.

Effect of alkali metal halides on the rate of hydrogenation of  
allyl alcohol. Trudy Inst.khim.nauk AN Kazakh.SSR 5:9-14 '59.  
(MIRA 13:6)

(Allyl Alcohol)  
(Alkali metal halides)  
(Hydrogenation)

SOKOL'SKIY, D.V.; POPOVA, N.M.

Adsorption of hydrogen on Ni-ZnO catalysts. Trudy Inst.khim.nauk  
AN Kazakh.SSR 5:15-19 '59. (MIRA 13:6)  
(Hydrogen) (Adsorption) (Catalysts)

POPOVA, N.M.; SOKOL'SKIY, D.V.

Hydrogenation of allyl alcohol on Ni-ZnO catalysts. Trudy Inst.  
khim.nauk AN Kazakh.SSR 5:20-27 '59. (MIRA 13:6)  
(Allyl alcohol)  
(Hydrogenation)  
(Catalysts)

SHMONINA, V.P.; KHASANOVA, R.N.; SOKOL'SKIY, D.V.

Chromatographic separation of mixtures of nitrobenzene - aniline  
products. Trudy Inst.khim.nauk AN Kazakh.SSR 5:28-35 '59.  
(MIRA 13:6)

(Benzene)  
(Aniline)  
(Chromatographic analysis)

GOLODOVA, L.S.; SOKOL'SKIY, D.V.

Reactions of hydrogenation of natural fats and their simplest  
synthetic analogs - esters of high molecular weight fatty acids.  
Trudy Inst.khim.nauk AN Kazakh.SSR 5:36-43 '59. (MIRA 13:6)  
(Oils and fats)  
(Hydrogenation)  
(Acids, Fatty)

GOLODOVA, L.S.; SOKOL'SKIY, D.V.; POD'YACHEVA, Ye.A.

Kinetics and mechanism of hydrogenation of sunflower seed oil in  
solutions. Trudy Inst.khim.nauk AN Kazakh.SSR 5:44-49 '59.  
(MIRA 13:6)

(Sunflower seed oil)  
(Hydrogenation)

50X0158-7  
YERZHANOV, A.I.; SILOL'SKIY, D.V.

Potentimetric study of benzalacetone hydrogenation on a Pd-Ni  
skeletal catalyst. Trudy Inst.khim.nauk AN Kazakh.SSR 5:56-63  
'59. (MIRA 13:6)  
(Hydrogenation) (Butenone)

BUVALKINA, L.A.; PAVLOV, G.V.; PRUSSAKOVA, Z.F.; SOKOL'SKIY, D.V.

Dehydroisomerization of the industrial fraction of n-butane on  
oxide catalysts. Trudy Inst.khim.nauk AN Kazakh.SSR 5:64-71  
'59. (MIRA 13:6)

(Butane)  
(Catalysts)



85429

S/081/50/000/016/003/012  
A006/A001

5.1196 also 2209

Translation from: Referativnyy zhurnal, Khimiya, 1960, No. 16, p. 73, # 64650

AUTHORS: Shmonina, V.P., Vlasova, K.M., Sokol'skiy, D.V.

TITLE: Catalytic Reduction of Aromatic Nitrocompounds. Information IX.  
The Effect of Ethyl Group on Reduction Kinetics of the Nitrogroup  
in Skeleton Nickel and Platinum

PERIODICAL: Izv. Akad. khim. nauk, AN KazSSR, 1959, Vol. 5, pp. 72-80

TEXT: The effect of the ethyl radical introduced into the composition of a nitrocompound, on the reduction rate of the nitrogroup, depends on a series of factors, first of all on the catalyst nature. When conducting the process on skeleton Ni, the introduction of an ethyl radical entails an accelerated reaction. The ethyl group speeds up the reaction more in the ortho-state than in the para-state. This is explained by the fact that the introduction of the ethyl group causes a reduced adsorption of the nitrocompound, thus increasing the hydrogen access to the catalyst surface. This redistribution of the catalyst surface under conditions, limiting the reaction by hydrogen activation, has a favorable effect

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85429

S/081/60/000/016/003/012  
A006/A001

Catalytic Reduction of Aromatic Nitrocompounds. Information IX. The Effect of the Ethyl Group on Reduction Kinetics of the Nitrogroup in Skeleton Nickel and Platinum

on the process rate. A slight reduction of the adsorption of a nitrocompound on Pt, occurring during the introduction of the ethyl group in the para-state, somewhat accelerates the reaction, whereas a further decrease of adsorption occurring by the introduction of a substitute into the ortho-state, inhibits the reaction. Information VI see RZhKhim. 1957, No. 6, # 18638.

The authors' summary

Translator's note: This is the full translation of the original Russian abstract.

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SHCHEGLOV, N.I.; SOKOL'SKIY, D.V.

Some methods used for "revivifying" nickel skeletal catalysts.  
Trudy Inst.khim.nauk AN Kazakh.SSR 5:92-96 '59. (MIRA 13:6)  
(Catalysts, Nickel)

S/081/61/000/005/008/024  
B110/B205

AUTHORS: Shcheglov, N. I., Sokol'skiy, D. V.

TITLE: Hydrogenation of acetylene in the liquid phase

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 5, 1961, 417, abstract 5413 (5L13) ("Tr. In-ta khim. nauk AN Kaz. SSR", 1959, 2, 97-104)

TEXT: A study has been made of the hydrogenation of  $C_2H_2$  in solutions of 0.1 n NaOH and 96 % alcohol by means of the (KT) (KT) Pd catalyst on  $CaCO_3$  or silica gel carrier at 2-80°C, the ratios  $C_2H_2:H_2$  - 1:1; 1:2; 1:3, and flow rates of 7-60 ml/min. In the presence of Pd/ $CaCO_3$ , an increase of temperature and the use of alcohol as a solvent increase the yield of polymerization products and lower that of  $C_2H_4$ . Addition of 5 % of Pb reduces the activity of KT and changes its degree of selectivity. Increase of the  $H_2$  concentration raises the yield of  $C_2H_4$  which is not affected by

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Hydrogenation of acetylene in...

S/081/61/000/005/008/024  
B110/B205

the rate of addition of the reagents. KT is regenerated by allowing air to pass through at elevated temperature and by subsequent reduction. The mixture of  $C_2H_2 + H_2$  (ratio = 1:3) was allowed to pass over Pd/silica gel at 80°C at a rate of 7 l/min.  $C_2H_4$  was thus obtained in a yield of 94-95 %.

[Abstracter's note: Complete translation.]

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SOKOL'SKIY, D.V.; DUNINA, L.P.

Hydrogenation of a sodium salt of propiolic acid on platinum. Trudy  
Inst.khim.nauk AN Kazakh.SSR 5:105-109 '59. (MIRA 13:6)  
(Propiolic acid)  
(Hydrogenation)

SOKOL'SKAYA, A.M.; SOKOL'SKIY, D.V.

Hydrogenation of cinnamic alcohol (styron). Trudy Inst.khim.  
nauk AN Kazakh.SSR 5:110-113 '59. (MIRA 13:6)  
(Cinnamyl alcohol)

FASMAN, A.B.; SOKOL'SKIY, D.V.

Effect of the amount of the catalyst on the rate of catalytic  
hydrogenation. Trudy Inst.khim.nauk AN Kazakh.SSR 5:114-145  
'59. (MIRA 13:6)

(Catalysts)  
(Hydrogenation)



SOKOL'SKIY, D.V.

Hydrogenation in solutions. Trudy Inst.khim.nauk AN Kazakh.SSR  
5:146-154 '59. (MIRA 13:6)  
(Hydrogenation)

28(4)

AUTHORS:

Sokol'skiy, D. V., Fasman, A. B.

SOV/32-25-9-47/53

TITLE:

Weighing Device for Pyrophoric Catalysts

PERIODICAL:

Zavodskaya laboratoriya, 1959, Vol 25, Nr 9, p 1141 (USSR)

ABSTRACT:

The method described in reference 1 for the hydrostatic weighing of pulverized metallic catalysts has some shortcomings. For example: the dynamometer must be gaged before each measurement, and the reading is taken with a cathetometer or another expensive and complicated device. In the present case, the spring balance was replaced by an ordinary analytical or technical balance and a special device was used (Fig). The latter consists in principle of a small tiltable glass cup which is suspended from one of the scale-beams by means of a wire with a weight, and which is immersed in a liquid. The weight is so chosen that the total weight on the respective scale-beam is greater than that on the other beam with the scale-pan. After the weighing, the catalyst is poured out together with the liquid in the glass cup and is thus not exposed to air. Semi-automatic ADV-200 scales proved to be especially suited for these weighings. The net weight of the

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Weighing Device for Pyrophoric Catalysts

SOV/32-25-9-47/53

catalyst is calculated by an equation. The specific weight must be known and can be determined by special methods. There are 1 figure and 1 Soviet reference.

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk Kazakhskoy SSR  
(Institute of Chemical Sciences of the Academy of Sciences  
of the Kazakh SSR)

Card 2/2

5.7190  
5.3200  
5(4)

66872  
SOV/76-33-11-35/47

AUTHORS:

Popova, N.M., Sokol'skiy, D.V.

TITLE:

The Mechanism of the Hydrogenation of Benzoquinone on Pt, Pd/CaCO<sub>3</sub> and Skeleton Nickel

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 11, pp 2573-2578 (USSR)

ABSTRACT:

Benzoquinone was hydrogenated on platinum, on palladium precipitated onto calcium carbonate, and on skeleton nickel, to clarify the reaction mechanism and to establish the stability of the contacts. The main results on the kinetics and the potentiometric measurements were already given in detail (Ref 1). The hydrogenation of quinone was carried out in dioxane, benzene, alcohol, and 0.1 n acetic acid. The course of the reaction on Pt and Pd/CaCO<sub>3</sub> (prepared according to the conventional methods (Ref 2)) is according to the zero-order to the absorption of one mol of hydrogen. The reaction medium influences the reaction rate and the end-products of the hydrogenation. The hydrogenation rate increases with Pt in the order: dioxane > alcohol > acetic acid. In opposition to Pd/CaCO<sub>3</sub> the benzene ring is hydrogenated in an acid medium on Pt at reversible hydrogen-potential to cyclohexanol. On

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The Mechanism of the Hydrogenation of Benzoquinone  
on Pt, Pd/CaCO<sub>3</sub> and Skeleton Nickel

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Pt and Pd/CaCO<sub>3</sub>, quinone is hydrogenated to hydroquinone as mentioned above according to the zero-order, (with the exception of hydrogenation in acetic acid) but the potential shifts into the anode range to 0.66-0.68 v. This potential shift is caused by taking off of the adsorbed hydrogen on the surface of the catalyst and the determination of a redox potential of the system quinone - hydroquinone. The catalyst again becomes a hydrogen electrode after the hydrogenation of the quinone. The apparent activation energy of the quinone hydrogenation on Pt and Pd/CaCO<sub>3</sub> is 1-2 kcal/mol. The quinone hydrogenation at the high anode potential of the catalyst with low activation energy is explained by the data of the chemical analysis, the kinetics, and the charge curves (Fig) in the field of the electron mechanism. The catalysts investigated appear partially as electron donors and partially as electron acceptors (hydrogen activation). The activity of Pt and Pd/CaCO<sub>3</sub> does not decrease at repeated hydrogenation of quinone, while the activity of the skeleton nickel is determined by the quantity of hydrogen sorbed by it. The hydrogenation on skeleton

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The Mechanism of the Hydrogenation of Benzoquinone  
on Pt, PdCaCO<sub>3</sub> and Skeleton Nickel

SOV/76-33-11-35/47

nickel is related with the instability and the poor reproducibility of the hydrogen sorbed by the nickel. Contrary to Pt and Pd/CaCO<sub>3</sub> the desorption rate of the hydrogen is considerably higher owing to the excess quinone on the skeleton nickel than the hydrogen adsorption from the gas-phase. In conclusion, papers of L.V. Pizarzhevskiy (Ref 6), Stackelberg and Weber (Ref 11), D.V. Sokol'skiy (Ref 18), Remik (Ref 15), A.I. Krasil'shchikov (Ref 20), and S.Z. Roginskiy (Ref 21) are mentioned in the article. There are 1 figure, 1 table, and 24 references, 16 of which are Soviet.

ASSOCIATION: Akademiya nauk KazSSR (Academy of Sciences of the KazSSR)

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5.3200  
5.1190

66673

SOV/76-33-11-36/47

5(4)

AUTHORS:

Sokol'skiy, D. V., Zakumbayeva, G. D.

TITLE:

The Influence of Potassium Bromide Additions on the Mechanism of the Catalytic Hydrogenation of Some Organic Compounds

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 11, pp 2579-2585 (USSR)

ABSTRACT:

The influence of neutral electrolytes on the mechanism of catalytic hydrogenation has hitherto scarcely been investigated. Only recently Erdey-Gruz and Tsimmer (Ref 1), and Khosino and Miyata (Ref 2) carried out such investigations. The potentiometric method developed by D. V. Sokol'skiy and V. A. Druz' (Ref 3) makes possible to investigate the influence of the above-mentioned additions on the structure of the double-layer and on the concentration relation of the reacting substances on the surface of the pulverized catalysts. Additions of potassium bromide were investigated in the present case, since studies of A. N. Frumkin (Ref 4) showed that the bromine anion influences the reduction on the Pt - H<sub>2</sub> electrodes. The ex-

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periments were made on a skeleton nickel catalyst (0.3 g),

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cyclohexene, allyl alcohol, mesityl oxide, and p-nitrophenol being hydrogenated. 50%-ethanol and 0.01, 0.1, 0.5, and 1% solutions of KBr in 50% ethanol at 20, 30, and 40° were used. The kinetic and potential curves obtained (Fig 1) show that with an increase in the concentration of the potassium bromide the adsorption of the cyclohexene on the surface of the catalyst decreases as well as the rate of hydrogenation. It is assumed that the bromine anion forms a film on the surface of the catalyst by which an additional potential barrier is formed which prevents the cyclohexene from entering into the reaction. Calculations of the activation energy (Table 1) show that the limiting stage of the cyclohexene hydrogenation on the skeleton nickel represents the activation of the cyclohexene, and that this activation is increased by the addition of KBr. The influence of additions of potassium bromide on the hydrogenation of allyl alcohol (Figs 2,3) is weaker than at cyclohexene, while with p-nitrophenol (Fig 5) the effect observed is similar to that with cyclohexene. The hydrogenation of mesityl oxide is accelerated by small additions of potassium bromide (0.01

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and 0.1n) (Fig 4), but inhibited by higher concentrations (0.5 and 1n), which fact is explained by an orientation of the dipoles. It is assumed that the more negative the dipole momentum of the substance is the worse is the hydrogenation in the presence of bromine ions. The hydrogenation of the mesityl oxide is also limited by the activation of the mesityl oxide (Table 2, activation energies). With respect to the amount of the adsorption the compounds investigated can be listed in the following order: cyclohexene < allyl alcohol < mesityl oxide < p-nitrophenol. There are 5 figures, 2 tables, and 8 Soviet references. 4

ASSOCIATION: Akademiya nauk KazSSR (Academy of Sciences of the KazSSR)

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5(4)

SOV/20-124-4-42/67

AUTHORS:

Sokol'skiy, D. V., Academician, AS Kazakhskaya SSR,  
Zakumbayeva, G. D.

TITLE:

The Influence of the Halides of Alkali Metals Upon the Mechanism of the Catalytic Hydrogenation of Cyclohexene (Vliyaniye galoidov shchelochnykh metallov na mekhanizm kataliticheskogo gidrirovaniya tsiklogeksena)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 4, pp 880-882 (USSR)

ABSTRACT:

The influence exercised by salts on the catalytic hydrogenation of solutions has hitherto been only very little investigated. The authors investigated the hydrogenation of cyclohexene on a skeleton-nickel-catalyst (0.5 g) in solutions of 0.01; 0.1; 0.5 and 1 n KCl, KBr and KJ in 50% ethyl alcohol at the temperatures of 20, 30, 40°. For comparison, experiments were also carried out with 50%-ethyl alcohol without any additions. The authors investigated the kinetics of hydrogen absorption and determined the potential of the pulverulent catalyst. A diagram shows the kinetic curves and the potential curves for the hydrogenation of cyclohexene in the presence of KCl at 20°. The rate of hydro-

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SOV/20-124-4-42/67

The Influence of the Halides of Alkali Metals Upon the Mechanism of the Catalytic Hydrogenation of Cyclohexene

generation decreases with increasing concentration of the KCl. Additions of KCl shift the potential of the catalyst towards the negative side. With increasing concentration, the rate of hydrogenation of the KCl decreases. The second diagram shows the kinetic curves and the potential curves for the hydrogenation of cyclohexene in the presence of KBr. The influence exercised by KCl and KBr is nearly the same in both cases, a certain difference becoming noticeable only in the case of the potential curves. The hydrogenation of cyclohexene in the presence of additions of KCl and KBr takes place at more negative potentials, and the rate of hydrogenation decreases accordingly. This is apparently due to the decreases of the adsorption of cyclohexene on the catalytic surface in the presence of additions. The activation energy of the hydrogenation of cyclohexene grows with increasing concentration of the admixtures from 2 to 6 kcal/mol. Additions of KJ reduce the rate of hydrogenation of cyclohexene still more. For the potential of the catalyst it holds that  $Cl^- < Br^- < J^-$ . The pH-value of the substances investigated was somewhat modified after the experiments. A

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The Influence of the Halides of Alkali Metals Upon the Mechanism of the Catalytic Hydrogenation of Cyclohexene

potassium-cation is adsorbed in a KCl solution on the surface of the nickel catalyst, but in solutions of KBr and KJ an anion is adsorbed. For the binding energy of the adsorbed hydrogen it holds that  $Cl^- < Br^- < J^-$ . There are 3 figures, 1 table, and 6 references, 3 of which are Soviet.

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk KazSSR  
(Institute of Chemical Sciences of the Academy of Sciences,  
Kazakhskaya SSR)

SUBMITTED: August 25, 1958

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5(2,3)

AUTHORS:

Sokol'skiy, D. V., Academician  
~~AS KazSSR~~, Yezhahova, M. S.

SOV/20-125-1-26/67

TITLE:

On the Possibility of Using a Platinum-Palladium Catalyst (1:3)  
 During Longer Periods (O vozmozhnosti prodolzhatel'noy raboty  
 platino-palladiyevogo katalizatora (1:3))

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 1, pp 101-103  
 (USSR)

ABSTRACT:

If the molecule of an adsorbed poison is removed from the  
 surface of platinum catalysts, they can be used for a long  
 time (Refs 1-4). Thus, a detoxication by rinsing with a  
 solution of an unsaturated compound is possible if the catalyst  
 was poisoned at room temperature e.g. with diethyl-phenyl  
 arsine. This restoration, however, becomes weaker on a heating  
 of the catalyst above 100°. The poisoning substance  
 (elementary arsenic) may be electrochemically removed from the  
 surface of platinized platinum (Ref 5). In this connection the  
 electrode desorbs only 15% of the amount of arsenic. Probably  
 arsenic had penetrated into the interior of the platinum  
 lattice (Ref 6). The experiments carried out by the authors on  
 a platinum-palladium catalyst (ratio 1:3) (according to Ref 7)

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On the Possibility of Using a Platinum-Palladium  
Catalyst (1:3) During Longer Periods

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have demonstrated that it can be used for a long time if it has had the necessary treatment. Figure 1 shows the charge curves of the electrode before the beginning of the experiments and after 77 experiments. As may be seen, the characteristics of the electrode practically does not change at all. Figure 2 shows the kinetic hydrogenation curves of cyclohexene in 0.1 N  $H_2SO_4$  in a 50% (v) alcohol at 25°C. They were taken from one and the same electrode Nr 1. As may be seen from figure 2, the activity of the electrode remained practically unchanged. The catalyst consisting of a platinum-palladium alloy (1:3) is more stable in an acid medium (it can be used for 100 experiments) while it loses its activity in an alkaline medium after a small number of experiments (15). There are 2 figures and 8 references, 4 of which are Soviet.

ASSOCIATION: Institut Khimicheskikh nauk Akademii nauk KazSSR (Institute of Chemical Sciences of the Academy of Sciences, Kazakhskaya SSR)

SUBMITTED: October 16, 1958

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5(4)  
AUTHORS: Sokol'skiy, D. V., Academician of the SOV/20-126-2-30/64  
AS Kazakh SSR, Skopin, Yu. A.

TITLE: Investigation of an Oxide-Platinum Catalyst by the  
Electrochemical Method (Izucheniye okisno-platinovogo  
katalizatora elektrokhimicheskim metodom)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 2,  
pp 334-336 (USSR)

ABSTRACT: The present paper supplies data concerning the reduction of  
platinum oxide in acid and basic solutions accompanied by  
the simultaneous variation of the potential of the powder.  
Also the charge curves of platinum-niello were plotted. The  
production of the platinum oxide and the apparatus used for  
its reduction have already been described (Refs 2, 3). First,  
the reduction of platinum oxide into 0.1 n, 1 n, and 5 n  
sulphuric acid is discussed. A diagram shows the dependence  
of the quantity of oxygen absorbed on time, and the variation  
of the potential of the platinum wire during the reduction  
of the platinum oxide. During the first minutes of stirring,  
the potential shifts by 100 - 120 mv into the oxygen range,

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Electrochemical Method

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and at this instant the rate of reduction is the highest. The potential then attains values that are by 20 mv below the reversible hydrogen potential, and tends slowly towards the value 0 till the end of the reduction. At the beginning of the experiment platinum energetically absorbs not only the hydrogen of the gaseous phase, but also the hydrogen adsorbed by the wire. The velocity of platinum oxide reduction decreases with an increasing concentration of the acid. The hydrogen is absorbed further also after the quantity that is theoretically necessary for reduction has been attained. Apparently this excess quantity of hydrogen is absorbed by the platinum-niello formed as a result of the reduction of the platinum oxide. In this way it is possible to determine also the quantity of hydrogen absorbed by the platinum-niello. Next, the reduction of the platinum oxide in 0.1 n, 1 n, and 5 n solutions of KOH is discussed. In the case of all investigated concentrations of the base, the reduction of the platinum oxide is preceded by an induction period, the duration of which depends on the concentration of the base. The potential of the platinum wire is shifted to the largest

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extent at the highest reduction velocity into the oxygen domain. The anodic charge curves of platinum-niello plotted in anodic solutions have no distinctly marked transition within the range of the double layer. The quantity of adsorbed hydrogen increases with increasing concentration of the base. The last part of the present paper deals with the reduction of platinum oxide in water, ethyl alcohol, n-hexane, and benzene. The curve of platinum-oxide reduction in n-hexane is similar to the analogous curve for 0.1n sulphuric acid. There are 4 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Kazakhskiy gosudarstvennyy universitet im. S. M. Kirova  
(Kazakh State University imeni S. M. Kirov)  
Kazakhskiy sel'skokhozyaystvennyy institut  
(Kazakh Agricultural Institute)

SUBMITTED: February 10, 1959

Card 3/3

5 (3)

AUTHORS:

Bezverkhova, S. T.; Sokol'skiy, D. V., SOV/20-126-4-24/62  
Academician AS KazSSR

TITLE:

The Hydrogenation of Furyl Alcohol on a Skeleton Nickel Catalyst (Gidrirovaniye furilovogo spirta na skeletnom nikel'evom katalizatore)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 4, pp 777-779 (USSR)

ABSTRACT:

The catalytic reduction of furan compounds (Ref 1) was frequently studied (Refs 2-5) because of their great practical value. In the present paper, the process mentioned in the title was studied from a kinetic and potentiometric point of view (Ref 9), in its dependence upon the temperature (8, 20, 40 and 60°) and upon the solvent (0.1n NaOH, water, ethanol 96%). In the experiments carried out by the authors, furyl alcohol is hydrogenated to tetrahydrofuryl alcohol, by absorbing 2 mol of hydrogen: the reaction rate is proportional to the amount of catalysts and in its first part does not depend upon the weighed amount of substances. Figure 1 and table 1 show the results of the reduction of 0.15 ml of furyl alcohol on 0.31 g skeleton nickel at different temperatures. The hydrogenation is quickest in

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The Hydrogenation of Furyl Alcohol on a Skeleton  
Nickel Catalyst

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ethanol, in hydrous mediums hydrogen is absorbed more slowly, in alkali the reaction is slowest. An increase of the temperature accelerates the reaction. In the course of the process, the catalyst potential as well as the rate depend upon the medium and are smallest in alkali, larger in water and largest in alcohol. The reduction takes place on the nickel surface which on the whole is filled by hydrogen. The dependence of the reaction velocity upon the absolute decrease of the potential in different mediums, allows the conclusion that the process of hydrogenation in this case is checked by the rate of activation of furyl alcohol. From the shape of the potential curve one may estimate the rate of regeneration of hydrogen on the surface of skeleton nickel during the reaction. This process takes place more quickly in water and alcohol than in alkali. Although the same solvents are used, the catalyst is more sensitive to the temperature. At 40° and 60° its potential does not return to a reversible hydrogen potential. The activation energy computed from kinetic data, also depends upon the medium and upon the potential of the

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The Hydrogenation of Furyl Alcohol on a Skeleton  
Nickel Catalyst

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catalyst. It conforms with a scheme suggested earlier, a scheme of the inter-reaction between a decrease of the potential, the filling of the surface by hydrogen, and the activation energy (Ref 10). The solvent exercises great influence on the constancy of activation of the catalyst in a series of successive experiments of the same proportion of catalysts. This is explained by the influence of the medium on the adsorption of the reaction product. The ratio  $B_1:B_2$  shows that the absorption of furyl alcohol in an alcoholic medium is the same as that of the product of its reduction which suppresses the activity of the catalyst considerably. The activity of skeleton nickel is more stable in water and alkali. There are 1 figure, 2 tables, and 10 references, 9 of which are Soviet.

SUBMITTED: February 7, 1959

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07061

5.1190  
5(2), 5(3)  
AUTHORS:

SOK/20-129-4-27/65  
Sokol'skiy, D. V., Academician AS KazSSR, Gil'debrand, Ye. I.

TITLE:

Pressure Influence on the Specific Hydrogenation Activity of Platinum on Aluminum Gel

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 4, pp 813-815 (USSR)

ABSTRACT:

The authors wanted to investigate the influence exercised by hydrogen pressure on the dependence of the activity mentioned in the title on the platinum content of the carrier. The platinum activity was investigated at the example of dimethyl vinyl acetylenyl carbinol (in the following referred to as DVAC) and picric acid under atmospheric pressure and under 1 to 2 atmospheres excess pressure. The authors produced 16 catalysts with a Pt content of 0.081 to 1.78%. Platinum was applied to aluminum gel at room temperature from dilute  $PtCl_4$  solutions of different concentration. After mixing for 2 hours platinum was quantitatively adsorbed on gel. The apparatus is described in reference 3. The temperature of the experiments was  $35^{\circ}$ , the medium was 50% alcohol. After complete hydrogenation of carbinol picric acid was added. The hydrogenation rate of DVAC increases slowly for all

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Pressure Influence on the Specific Hydrogenation  
Activity of Platinum on Aluminum Gel

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pressure variants. It attains the maximum after  $2/3$  of the theoretically necessary hydrogen are adsorbed, and then rapidly decreases again. The kinetic curves of picric acid are S-shaped. The catalyst activity was determined from the period in which  $50\%$  of the hydrogenation was effected and from the duration of absorption of the theoretically necessary amount of hydrogen ( $2/3$  of this amount for DVAC and 45 ml for picric acid) and finally by the absorption rate of hydrogen on the section of the curve before the maximum. All variants yielded similar results. Figure 1 shows the dependence of the general and specific activity on the degree of surface occupation in hydrogenation. With increasing occupation by platinum the catalyst activity increases proportionally to pressure. The maxima and minima are easy to reproduce for all 3 pressure variants and thus they are not arbitrary. The specific platinum activity changes relatively little on the entire length of the curves. Obviously all the platinum applied takes part in the reaction. The different atom combinations,

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Pressure Influence on the Specific Hydrogenation  
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however, which are formed at different concentrations, also have different activity. The mode of action of the active platinum layers is not changed by the increasing hydrogen pressure. It is the same for the hydrogenation of unsaturated DVAC bonds and for the nitro groups of picric acid. There are 1 figure and 4 Soviet references.

ASSOCIATION: Kazakhskiy gosudarstvennyy universitet im. S.M. Kirova  
(Kazakh State University imeni S.M. Kirov)

SUBMITTED: August 11, 1959

Card 3/3





SHCHEGLOV, N.I.; SOKOL'SKIY, D.V.; ISHCENKO, A.A.

Promoting a skeletal nickel catalyst. Report No. 1: Hydrogenation  
of m-nitrophenol. Izv. AN Kazakh. SSR. Ser. khim. no. 2:81-88 '60.  
(MIRA 14:5)

(Catalysts, Nickel) (Phenol) (Hydrogenation)

SHCHEGLOV, N.I.; SOKOL'SKIY, D.V.; ISHCHENKO, A.A.

Promoting a skeletal nickel catalyst. Report No. 2: Hydrogenation  
of methyl ethyl ketone. Izv. AN Kazakh. SSR Ser. khim. no. 2:89-  
92 '60. (MIRA 14:5)

(Ketone) (Hydrogenation) (Catalysts, Nickel)

SOKOL'SKIY, D.V.; BIZHANOV, F.

Hydrogenation of nitriles. Report No. 1: Hydrogenation of  
isophthalonitrile on a cobalt catalyst. Izv. AN Kazakh. SSR  
Ser. khim. no. 2:101-104 '60. (MIRA 14:5)  
(Isophthalonitrile) (Cobalt) (Hydrogenation)

S/031/60/000/03/009/024  
D035/D003

(  
AUTHOR: Zhakupova, A. and Sokol'skiy, D.V.

TITLE: The Hydrogenation of Mixtures of Phenyl-propionic  
Acid or its Salt with Dimethylacetinyl-carbinol

PERIODICAL: Vestnik Akademii nauk Kazakhskoy SSR, 1960, Nr 3,  
pp 45-50 ✓

ABSTRACT: The authors give a detailed description of their experiments carried out in view to investigate kinetics and selectivity of hydrogenation of phenyl-propionic acid or its salt with dimethylacetinyl-carbinol. Having first investigated the reaction of individual components of this mixture to the hydrogenation process at various temperatures and using different solvents, the authors found the following: The hydrogenation of the mixture of the phenyl-propionic acid or its Na-salt with the

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S/031/60/000/03/009/024  
D035/D003

The Hydrogenation of Mixtures of Phenyl-propionic Acid or its Salt with Dimethylacetinyl-carbinol

dimethylacetinyl-carbinol with a molal proportion

$\frac{\text{acid}}{\text{carbinol}} = \frac{2}{1} ; \frac{1}{1} ; \frac{1}{2}$  occurs in a selective way:

on the beginning - a treble bond of the phenyl-propionic acid or its Na-salt, then a treble bond of dimethylacetinyl-carbinol; after the saturation of these treble bonds occurs the hydrogenation of cinnamic acid and, finally, of the dimethylacetinyl-carbinol. The nature of the solvent has a certain influence on the degree of selectivity, it is the highest when alkaline agents are used. The hydro-

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S/031/60/000/03/009/024  
D035/D003

The Hydrogenation of Mixtures of Phenyl-propionic Acid or its  
Salt with Dimethylacetinyl-carbinol

genation of mixtures is the more rapid the higher is  
the temperature. There are 5 tables, 2 graphs and  
7 Soviet references. ✓

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SOKOL'SKIY, D.V.

Principles for the selection of catalysts for liquid phase  
hydrogenation. Probl. kin. i kat. 10:178-186 '60. (MIRA 14:5)

1. Akademiya nauk Kazakhskoy SSR.  
(Hydrogenation) (Catalysts)

S/031/60/000/011/002/008  
A161/A133

25170

5.3300

AUTHORS: Sokol'skaya, A.M., Sokol'skiy, D.V.

TITLE: Hydrogenation of tolane

PERIODICAL: Akademiya nauk.Kazakhskoy SSR, Vestnik, no. 11, 1960, 20 - 23

TEXT: The kinetics of tolane hydrogenation were studied in alcohol solutions of nickel, platinum and palladium, with simultaneous measurement of the catalysts potential. Reference is made to the first hydrogenation of tolane by Kelber and Schwarz (Ref. 1) (of 1912) in acetic acid solution with colloidal platinum, and later by Zal'kind and Il'in (Ref. 2) in solution with colloidal palladium. The authors used the same method and apparatus as were employed previously (Ref. 3) for hydrogenation of styron. Tolane of a melting point of 62°C, was employed in the form of a benzene solution (1 millimeter - 0.0712 g tolane). Hydrogenation was carried out in the presence of skeleton nickel, platinum oxide (prepared by the Frampton's method (Ref. 5) - Frampton, Edwards and Henze. Amer Chem Soc. 1951, 73, 1443). Freshly distilled 96 - % ethanol was used as solvent. The results of experiments are illustrated by diagrams. The kinetic and potential curves in the case of 0.1 g skeleton nickel show that the reaction order

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SOKOL'SKIY, D.V., akademik; DUNINA, L.P.

Comparative hydrogenation of sodium propiolate on Pt, Pd, and Ni catalysts. Dokl.AN SSSR 132 no.5:1111-1113 Je '60.  
(MIRA 13:6)

1. Kazakhskiy gosudarstvennyy universitet im. S.M.Kirova.  
Akademiya nauk KazSSR (for Sokol'skiy).  
(Propiolic acid) (Hydrogenation)  
(Catalysts)

85523

S/020/60/133/003/028/031/XX  
B016/B067

5.1190 (1231, 1274 only)

AUTHORS: Sokol'skiy, D. V., Academician of the AS KazSSR, and  
Gil'debrand, Ye. I.

TITLE: Hydrogen Adsorption on Low-percent Pt/Al<sub>2</sub>O<sub>3</sub> and Pd/Al<sub>2</sub>O<sub>3</sub>  
Catalysts in the Liquid Phase

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 3, pp.609-612

TEXT: The authors' aim was to determine the amount and state of hydrogen adsorbed on hydrogenation catalysts. For this purpose they produced several Pt/Al<sub>2</sub>O<sub>3</sub> and Pd/Al<sub>2</sub>O<sub>3</sub> catalysts with a Pt and Pd content from 0.05 to 3.47 wt% on alumogel as a carrier. Pt was completely adsorbed on Al<sub>2</sub>O<sub>3</sub> at all concentrations, while Pd passed over into the filtrate already at a Pd content of the carrier of 0.6%. The Pd precipitated on Al<sub>2</sub>O<sub>3</sub> was irreversibly adsorbed. The authors recommend the method of chemical hydrogen extraction for determining the amount of hydrogen adsorbed on catalysts. A weighed portion of the catalyst was introduced into a known

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Hydrogen Adsorption on Low-percent  $\text{Pt/Al}_2\text{O}_3$   
and  $\text{Pd/Al}_2\text{O}_3$  Catalysts in the Liquid Phase

S/020/60/133/003/028/C31/XX  
B016/B067

volume of the solvent, and shaken in hydrogen. After the catalyst had been saturated with hydrogen, the remaining hydrogen was displaced from the gaseous phase by purified nitrogen. In the presence of nitrogen, an alcoholic quinone solution was added at  $-25^\circ\text{C}$  and shaken. After the end of the experiment, the catalyst was rapidly sucked off, and the hydroquinone in the filtrate was immediately determined. Tables 1 and 2 show the experimental results. Figs. 1 and 2 give the mean values from parallel experiments. The curves indicate that the amount of  $\text{H}_2$  (in ml) first increases with an increase of the metal content, and then decreases slightly. For  $\text{Pt/Al}_2\text{O}_3$  this peak is found in the range from 0.8 to 1.0% Pt, and for  $\text{Pd/Al}_2\text{O}_3$  between 0.5 and 0.6% Pd.  $\text{H}_2$  adsorption on the catalysts increases with a further increase in the weight of Pd after a small minimum has been passed. The absolute amount of hydrogen absorbed on  $\text{Pd/Al}_2\text{O}_3$  is smaller than that adsorbed on similar platinum catalysts. The maximum amount of  $\text{H}_2$  (3 ml per g of the catalyst) was found in catalysts with the maximum concentrations: 1.766% Pt and 3.47% Pd. The conversion of the

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Hydrogen Adsorption on Low-percent Pt/Al<sub>2</sub>O<sub>3</sub> and Pd/Al<sub>2</sub>O<sub>3</sub> Catalysts in the Liquid Phase S/020/60/133/003/028/031/XX  
B016/B067

adsorbed H<sub>2</sub> to 1 g of metal shows that the metal binds the more hydrogen, the less the surface is covered with metal. With a rising concentration of Pt and Pd in the catalyst, its adsorption capacity first decreases rapidly and, later, more slowly. The authors explain the increase in the specific activity of Pt at a very low content on the carrier with an increase in the magnetic susceptibility, which was observed by A.N. Maltsev and N. M. Kobozev (Ref. 4), by the fact that an electron interaction between the atoms and the carrier (semiconductor) occurs. Hence, the atoms adsorbed on the catalyst show a certain distant effect, i.e., a field is produced by a single metal atom fixed on the carrier surface, in which also hydrogen (obviously molecular hydrogen) is adsorbed. There are 2 figures, 2 tables, and 6 references: 5 Soviet and 1 British.

ASSOCIATION: Kazakhskiy gosudarstvennyy universitet (Kazakh State University)

SUBMITTED: March 21, 1960

Card 3/3

S/081/61/000/020/017/089  
B101/B147

AUTHORS: Popova, N. M., Sokol'skiy, D. V.

TITLE: Adsorption of hydrogen on Ni/SiO<sub>2</sub> catalysts

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 62, abstract  
20B467 (Izv. AN KazSSR, Ser. khim., no. 1 (19), 1961, 83-90)

TEXT: The kinetics of hydrogen desorption out of Ni/SiO<sub>2</sub> catalysts with varying content of Ni was studied. The catalysts were reduced at 400, 500, 600, and 800°C by dehydrogenation with benzoquinone. It is shown that hydrogen sorption reaches a maximum of 16 - 17 milliliters on catalysts reduced at 500°C. Catalysts containing 20 - 40% Ni sorbed a maximum amount of hydrogen per gram of catalyst at all reduction temperatures. Adsorption per gram of nickel is strong in the range of small fillings (1.2% Ni), amounting to 400 milliliters of H<sub>2</sub> per g of Ni.

Reduced Ni/SiO<sub>2</sub> catalysts are sensitive to long-lasting action of air.

In order that they keep the hydrogen sorbed by them, they must be stored in an H<sub>2</sub> atmosphere. [Abstracter's note: Complete translation.]

Card 1/1

SHCHEGLOV, N.I.; SOKOL'SKIY, D.V.; ISHCHEENKO, A.A.

Hydrogenation of terephthalic acid dinitrile. Izv.AN Kazakh. SSR.  
Ser.khim. no.1:91-94 '61. (MIRA 16:7)  
(Terephthalic acid) (Nitriles) (Hydrogenation)

31727

S/081/61/000/021/013/094

B102/B138

5.3610

AUTHORS: Sokol'skiy, D. V., Bizhanov, F.

TITLE: Hydrogenation of phthalonitriles on a skeleton cobalt catalyst

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 21, 1961, 51, abstract 21B417 (Izv. AN KazSSR. Ser. khim., no. 1 (19), 1961, 95 - 98)

TEXT: The authors studied the influence of additions of piridine and quinoline on the hydrogenation of phthalonitriles on a skeleton Co catalyst in a methyl-alcoholic medium with an addition of  $\text{NH}_3$ . It was found, that an addition of 4 - 5 milliliters of liquid  $\text{NH}_3$  will raise the xylylenediamine yield by 35 - 40%, while the addition of piridine and quinoline to the amount of 0.02% by weight of phthalonitrile will raise the xylylenediamine yield by another 10 - 15%. Thus the yield becomes almost quantitative. Neutral salts of p- and m-xylylendiamine were

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Hydrogenation of phthalonitriles ...

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S/081/61/000/021/013/094  
B102/B138

obtained. Similar experiments carried out with skeleton nickel showed that, in the same conditions, this catalyst has lower activity in this reaction than that of the skeleton Co catalyst. [Abstracter's note: Complete translation.]

Card 2/2



GOLODOV, V.A.; FASMAN, A.B.; SOKOL'SKIY, D.V., akademik

Catalytic reduction of p-benzoquinone by carbon monoxide in  
the liquid phase. Dokl. AN SSSR 151 no.1:98-101 J1 '63.  
(MIRA 16:9)

1. Kazakhskiy gosudarstvennyy universitet im. S.M.Kirova.
2. AN Kazakhskoy SSR (for Sokol'skiy).  
(Benzoquinone) (Carbon monoxide) (Palladium catalysts)

FASMAN, A.B.; GOLODOV, V.A.; SOKOL'SKIY, D.V.

Kinetics and mechanism of the catalytic hydrogenation of the liquid phase. Part 1: Influence of various physical factors on the kinetics of the hydrogenation process. Kin. i kat. 2 no.1:144-153 Ja-F '61.

(MIRA 14:3)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M. Kirova, Khimicheskoy fakul'tet.

(Hydrogenation)

(Chemical reaction, Rate of)

S/031/61/000/006/001/001  
B105/B206

AUTHORS: Sokol'skiy, D. V., Academician, Bizhanov, F.

TITLE: Preparation of an active cobalt skeleton catalyst

PERIODICAL: Akademiya nauk Kazakhskoy SSR. Vestnik, no. 6, 1961, 57-59

TEXT It was the author's aim to investigate the effect of the lixiviation temperature on the activity of the cobalt skeleton catalyst. The experimental part describes the preparation of the cobalt-aluminum alloy, temperatures from 900-1000°C up to 1800-1900°C having been used. When preparing the catalyst, lixiviation is done by a 20% caustic soda solution at various temperatures. The activity of the catalyst was tested during hydrogenation of mono- and dinitriles under hydrogen pressure of 100 atm in a rotary autoclave. The experimental technique and the analysis of products was described by the authors in previous papers. Amines in fractions were determined by titration in 30% alcohol. Methyl alcohol was used as solvent. Table 1 shows the effect of the lixiviation temperature of the catalysts on the yield of primary amine. The following experimental conditions are mentioned: catalyst made from 6 g of the alloy Co:Al = 1:1, nitrile 10 g,

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Preparation of an active cobalt ...

S/031/61/000/006/001/001  
B105/B206

metanol 50 ml, liquid ammonia 10 ml, initial hydrogen pressure 10 atm and experimental temperature 120°C. The change of activity of a catalyst as a function of its length of storage and the fatigue of a newly prepared catalyst were also investigated. It was established that the catalyst activity remains almost unchanged during storage of up to five days, and that the catalyst loses half its initial activity after 15 days. All its activity is lost after 30 days. Repeated lixiviation of the catalyst restores its activity. There are 2 tables and 8 references: 2 Soviet-bloc and 6 non-Soviet-bloc.

ASSOCIATION: AN KazSSR (AS Kazakhskaya SSR)

Card 2/3

SOKOL'SKIY, G.A.; KNUNYANTS, I.L.

Fluorine-containing  $\beta$ -sultones. Report 8:  $\beta$ -Sultones, promoters  
of acylation. Izv.AN SSSR, Otd.khim.nauk no.6:1053-1055 Je '61.  
(MIRA 14:6)

(Sultones) (Acylation)

SOKOL'SKIY, G.A.; DMITRIYEV, M.A.; KNUNYANTS, I.L.

Fluorine-containing  $\beta$ -sultones. Report 9: Reactions between  
fluorine-containing  $\beta$ -sultones and mercaptans. Izv.AN SSSR.  
Otd.khim.nauk no.6:1055-1057 Je '61. (MIRA 14:6)  
(Sultones) (Thiols)

ZAKUMBAYEVA, G.D.; SOKOL'SKIY, D.V.

Effect of alkali metal halides on the hydrogenation rate of  
cyclohexene and mesityl oxide over palladium black. Trudy  
Inst.khim.nauk AN Kazakh.SSR 7:3-12 '61. (MIRA 15:8)  
(Alkali metal halides) (Hydrogenation)  
(Cyclohexene) (Penetenone)

POPOVA, N.M.; SOKOL'SKIY, D.V.

Hydrogenation of sunflower seed oil over Ni/ZnO catalysts. Trudy  
Inst.khim.nauk AN Kazakh.SSR 7:26-32 '61. (MIRA 15:8)  
(Sunflower seed oil) (Hydrogenation) (Catalysts)



SHCHEGLOV, N.I.; SOKOL'SKIY, D.V.; ISHCENKO, A.A.

Addition of promoters to skeletal nickel catalysts. Hydrogenation  
of furfurole. Trudy Inst.khim.nauk AN Kazakh.SSR 7:33-37 '61.  
(MIRA 15:8)

(Furaldehyde) (Hydrogenation) (Catalysts)

SHMONINA, V.P.; SOKOL'SKIY, D.V.

Mechanism of the catalytic reduction of nitrobenzene and some  
of its derivatives. Trudy Inst.khim.nauk AN Kazakh.SSR 7:38-53  
'61. (MIRA 15:8)  
(Nitrobenzene) (Reduction) (Catalysis)

SOKOL'SKAYA, A.M.; ZHELNINA, A.A.; SOKOL'SKIY, D.V.

Hydrogenation of cinnamyl alcohol. Report No.2. Trudy Inst.  
khim.nauk AN Kazakh.SSR 7:54-56 '61. (MIRA 15:8)  
(Cinnamyl alcohol) (Hydrogenation)

SOKOL'SKIY, D.V.; BIZHANOV, F.

Hydrogenation of nitriles. Report No.2: Hydrogenation of  
dinitrile of isophthalic acid on a cobalt catalyst. Trudy  
Inst.khim.nauk AN Kazakh.SSR 7:68-74 '61. (MIRA 15:8)  
(Isophthalic acid) (Nitriles) (Hydrogenation)